



From scientific evidence to public health recommendations: preparing for the next revisions of the WHO air quality guidelines



World Health Organization

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Всемирная организация здравоохранения

Европейское региональное бюро

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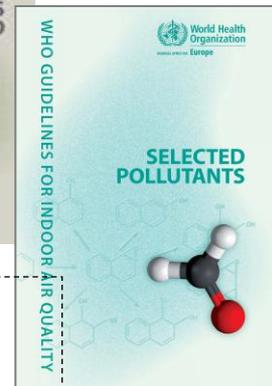
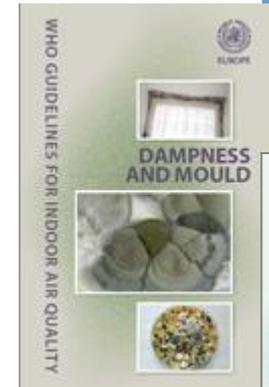
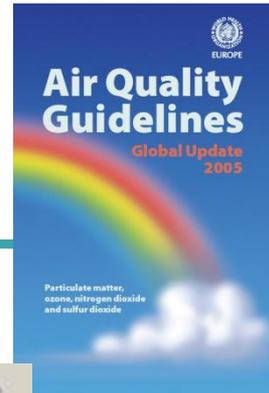
WHO Regional Office for Europe

Outline

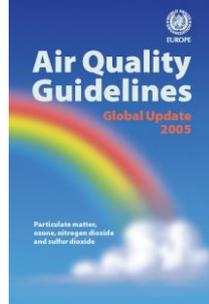
- Context and recent relevant evidence
- WHO process and requirements for guideline development
- Main questions for discussion
 - **Your thoughts!**

Context: WHO Air Quality Guidelines

- Evidence-based, normative guidance
 - Air quality guidelines
 - Guidelines for Europe (1987, 2000)
 - Global update (2005)
 - Indoor air quality
 - Dampness and mould (2009)
 - Selected pollutants (2010)
 - Household fuel combustion (2014)



Summary of WHO Air Quality Guidelines (2005)



Pollutant	Averaging time	AQG value
Particulate matter PM_{2.5}	1 year	10 µg/m ³
	24 hour (99 th percentile)	25 µg/m ³
PM₁₀	1 year	20 µg/m ³
	24 hour (99 th percentile)	50 µg/m ³
Ozone, O₃	8 hour, daily maximum	100 µg/m ³
Nitrogen dioxide, NO₂	1 year	40 µg/m ³
	1 hour	200 µg/m ³
Sulfur dioxide, SO₂	24 hour	20 µg/m ³
	10 minute	500 µg/m ³

Levels recommended to be achieved everywhere in order to significantly reduce the adverse health effects of pollution

Pollutants covered by previous WHO guidelines

Organic pollutants

- Acrylonitrile
- Benzene
- Butadiene
- Carbon disulfide
- Carbon monoxide
- 1,2-Dichloroethane
- Dichloromethane
- Formaldehyde
- Naphthalene
- PAHs
- Styrene
- Tetrachloroethylene
- Toluene
- Trichloroethylene
- Vinyl chloride

Inorganic pollutants

- Arsenic
- Cadmium
- Chromium
- Fluoride
- Fluoride
- Hydrogen sulphide
- Lead
- Manganese
- Mercury
- Nickel
- Platinum
- Vanadium

Classical pollutants

- Nitrogen dioxide
- Ozone and other photochemical oxidants
- Particulate matter
- Sulphur dioxide

Recent relevant evidence

International Agency for Research on Cancer



PRESS RELEASE
N° 221

17 October 2013

IARC: Outdoor air pollution a leading environmental cause of cancer deaths

Lyon/Geneva, 17 October 2013 – The specialized cancer agency of the World Health Organization, the International Agency for Research on Cancer (IARC), announced today that it has classified outdoor air pollution as *carcinogenic to humans* (Group 1).¹

After thoroughly reviewing the latest available scientific literature, the world's leading experts convened by the IARC Monographs Programme concluded that there is *sufficient evidence* that exposure to outdoor air pollution causes lung cancer (Group 1). They also noted a positive association with an increased risk of bladder cancer.

Particulate matter, a major component of outdoor air pollution, was evaluated separately and classified as *carcinogenic to humans* (Group 1).

The IARC evaluation showed an increasing level of particulate matter and air pollution. All vary dramatically between locations, but the overall trend is upward in the world.



United States
Environmental Protection
Agency

December 2009
EPA/600/R-09-001a

Integrated Science Assessment for Particulate Matter

Includes Errata Sheet created on 2/10/2010

National Center for Environmental Assessment-RTP Division
Office of Research and Development
U.S. Environmental Protection Agency
Research Triangle Park, NC

December 2009

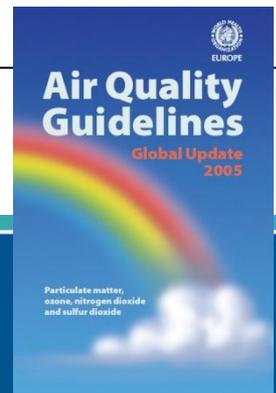


Review of evidence on health aspects of air pollution – REVIHAAP Project

Technical Report



This publication arises from the project REVIHAAP and has received funding from the European Union.



REVIHAAP and HRAPIE: 26 Key policy-relevant questions for the EU

PM, ozone, NO₂, SO₂, metals (As, Cd, Hg, Pb, Ni), PAHs

- Covers regulated air pollutants at EU level
- New findings regarding health effects
- Concentration-response functions and thresholds
- Air pollution constituents and sources
- Integration of evidence and policy implications
 - **WHO air quality guidelines**
 - EU policies
- Critical data gaps



Review of evidence
on health aspects of
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Technical Report



This publication arises from the project REVIHAAP and has received funding from the European Union.

REVIHAAP Main conclusions

- Considerable amount of new scientific information on health effects of PM, ozone and NO₂ has been published in the recent years
 - Effects observed *at levels commonly present in Europe*
 - Supports the scientific conclusions of the WHO Air Quality Guidelines, last updated in 2005
 - Evidence has *strengthened*
 - Indicates that the *effects can occur at air pollution concentrations lower* than those serving to establish the 2005 Guidelines

REVIHAAP expert group: recent evidence and implication for WHO guidelines

“We would recommend that WHO begins the process of developing revisions to the earlier Guidelines [2005], with a view to completing the review by 2015.”

REVIHAAP – PM (1)

*“There is a need to **revise the current WHO air quality guidelines for PM_{10}** (20 $\mu\text{g}/\text{m}^3$, annual average; and 50 $\mu\text{g}/\text{m}^3$, 24-hour average, 99th percentile) **and $PM_{2.5}$** (10 $\mu\text{g}/\text{m}^3$, annual average; and 25 $\mu\text{g}/\text{m}^3$, 24-hour average, 99th percentile).”*

*“It would be advantageous to develop an additional air quality guideline to capture the **effects of road vehicle PM emissions not well captured by $PM_{2.5}$** , building on the work on **black carbon and/or elemental carbon** (Health effects of black carbon; Janssen et al., 2012) and evidence on other pollutants in vehicle emissions.”*

REVIHAAP – PM (2)

*“Ultrafine particles: the data on concentration–effect functions are **too scarce to evaluate and recommend an air quality guideline.** The **same evaluation applies for organic carbon.** Current efforts to reduce the numbers of ultrafine particles in engine emissions should continue, and their effectiveness assessed, given the potential health effects.”*

REVIHAAP - O₃ and NO₂

OZONE:

*“... guidelines for **long-term average ozone concentrations** should be considered.”*

NO₂:

*“... new studies provide support for **updating the current WHO air quality guidelines for NO₂**, to give: (a) an epidemiologically based short-term guideline; and (b) an annual average guideline based on the newly accumulated evidence from outdoor studies. In both instances, this could result in lower guideline values.”*

REVIHAAP – SO₂

*“There is a need to **revisit the evidence base for setting the WHO air quality guidelines for SO₂** (very short-term and short-term).”*

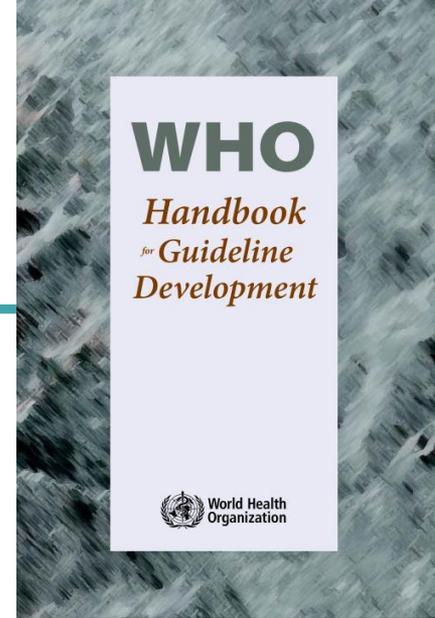
REVIHAAP – metals

Arsenic, Cadmium, Mercury, Lead, Nickel:

- In most cases emissions to air and contribution to population exposure through inhalation are minor
- For some, new evidence to be considered if AQG are reviewed

WHO requirements for guideline development

- Specific standards and methods for guideline development
 - Ensures that guidelines are free from biases, public health needs
 - Recommendations must be based on a comprehensive and objective assessment of the available evidence
 - The process used to develop the recommendations must be transparent



WHO process for guideline development

- WHO Guidelines Review Committee established in 2007; reviews and approves guideline proposals and final set of recommendations
- Declaration of potential personal, financial and academic interests of all experts involved
- Establishment of Guidelines Development Group; broad (separate) consultation with stakeholders
- Clear scope of guideline
- Identification of timeline, budget and support needed

Main questions for discussion

1. The evolution of WHO's air quality guidelines: where should they go?
 - a) Implication of recent scientific evidence for WHO air quality guidelines?
 - b) Recommendation of targets values (such as in the WHO 2005 global update)?
 - c) Local, national, regional, global context?

Main questions for discussion

2. Strategies and best practices for improving air quality: what is the role of air quality guidelines?
 - a) Effectiveness of interventions/methods to reach the AQGs and evidence of health benefits
 - b) Implementation of air quality management plans to decrease air pollution levels

THANK YOU!

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